

Name _____

Subtract the polynomials.

1) $(6x^5 + 16x^2 + 6) - (-12x^2 + 2x^5 - 9)$

1) _____

2) $(8x^5 - 14x^2 - 10) - (16x^2 + 5x^5 + 6)$

2) _____

3) $(5x^3 + 2x^5 + 5 + 9x^4) - (-6 + 2x^4 + 9x^5 - 3x^3)$

3) _____

4) $(8x^2 + 5x^4 - 4 + 2x^3) - (1 + 7x^3 + 7x^4 + 2x^2)$

4) _____

Find the product.

5) $\left(-\frac{1}{2}x - 7\right)\left(\frac{1}{5}x + 6\right)$

5) _____

6) $\left(\frac{1}{3}x + 10\right)\left(\frac{1}{3}x + 11\right)$

6) _____

7) $(x - 5)(x^2 + 5x - 2)$

7) _____

8) $(9x - 1)(x^2 - 4x + 1)$

8) _____

Factor completely using the grouping method to factor trinomials. If unfactorable, indicate that the polynomial is prime.

9) $5x^2 + 56x + 11$

9) _____

10) $2x^2 + 23x + 11$

10) _____

11) $3x^2 + 13x + 10$

11) _____

12) $3x^2 - 7x - 6$

12) _____

13) $2x^2 + 11x + 12$

13) _____

14) $3x^2 + 19x + 10$

14) _____

15) $2x^2 - 11x + 15$

15) _____

Factor completely.

16) $8p^3 - 1$

16) _____

17) $64p^3 - 1$

17) _____

18) $343p^3 - 1$

18) _____

19) $x^3 - 1000$

19) _____

20) $x^3 - 729$

20) _____

21) $x^3 - 125$

21) _____

22) $t^3 + 1000$

22) _____

23) $t^3 + 8$

23) _____

24) $t^3 + 125$

24) _____

25) $a^3b^3 + 64$

25) _____

26) $a^3b^3 + 8$

26) _____

Solve. Round to two decimal places unless otherwise noted.

27) If the average cost per unit $C(x)$ to produce x units of plywood is given by $C(x) = \frac{900}{x + 30}$, 27) _____
what is the unit cost for 50 units?

28) If the average cost per unit $C(x)$ to produce x units of plywood is given by $C(x) = \frac{1200}{x + 40}$, 28) _____
what is the unit cost for 50 units?

29) Suppose the cost per ton, $C(x)$, to build an oil platform of x thousand tons is approximated 29) _____
by $C(x) = \frac{262,500}{x + 525}$. What is the cost per ton for 50 thousand tons?

30) Suppose the cost per ton, $C(x)$, to build an oil platform of x thousand tons is approximated 30) _____
by $C(x) = \frac{262,500}{x + 525}$. What is the cost per ton for 10 thousand tons?

31) In the following formula, $S(x)$ is the minimum number of hours of studying required to attain a 31) _____
test score of x :
$$S(x) = \frac{0.49x}{100.5 - x}$$

How many hours of study are needed to score 90?

32) In the following formula, $S(x)$ is the minimum number of hours of studying required to attain a 32) _____
test score of x :
$$S(x) = \frac{0.43x}{100.5 - x}$$

How many hours of study are needed to score 85?

Simplify by factoring.

33) $\frac{3x + 12}{x^2 + 4x}$

33) _____

34) $\frac{4x + 16}{x^2 + 4x}$

34) _____

35) $\frac{3x + 4}{15x^2 + 26x + 8}$

35) _____

36) $\frac{3x + 2}{15x^2 + 22x + 8}$

36) _____

37) $\frac{y^2 + 10y + 21}{y^2 + 11y + 24}$

37) _____

38) $\frac{y^2 - 3y - 10}{y^2 + 2y - 35}$

38) _____

39) $\frac{m^2 - 25}{m^2 - 10m + 25}$

39) _____

40) $\frac{m^2 - 64}{m^2 + 16m + 64}$

40) _____

List all numbers for which the rational expression is undefined.

$$41) \frac{b-7}{7b-21}$$

41) _____

$$42) \frac{b-8}{8b-16}$$

42) _____

$$43) \frac{x^2-25}{x^2+15x+56}$$

43) _____

$$44) \frac{x^2-49}{x^2+13x+40}$$

44) _____

$$45) \frac{x^2-36}{x^2-13x+42}$$

45) _____

$$46) \frac{x^2-49}{x^2+4x-32}$$

46) _____

$$47) \frac{x^2-25}{x^2-7x-18}$$

47) _____

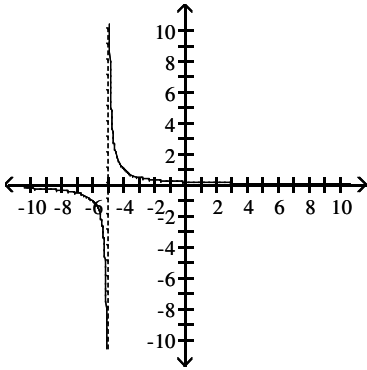
MULTIPLE CHOICE.

**Choose the one alternative that best completes the statement or answers the question.
Show all work in the space provided.**

Choose the correct equation of the given graph.

48)

48) _____



A) $f(x) = \frac{x+5}{x}$

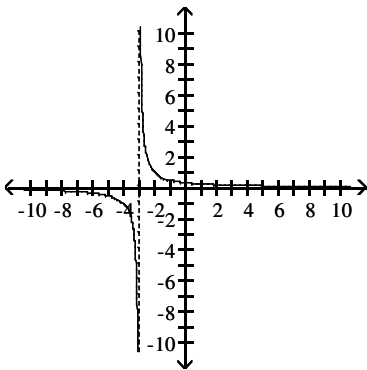
B) $f(x) = \frac{x}{x+5}$

C) $f(x) = \frac{1}{x-5}$

D) $f(x) = \frac{1}{x+5}$

49)

49) _____



A) $f(x) = \frac{x+3}{x}$

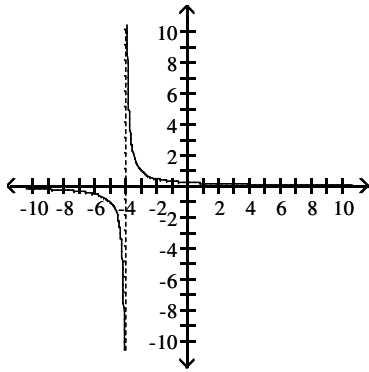
B) $f(x) = \frac{1}{x+3}$

C) $f(x) = \frac{x}{x+3}$

D) $f(x) = \frac{1}{x-3}$

50)

50) _____



A) $f(x) = \frac{1}{x+4}$

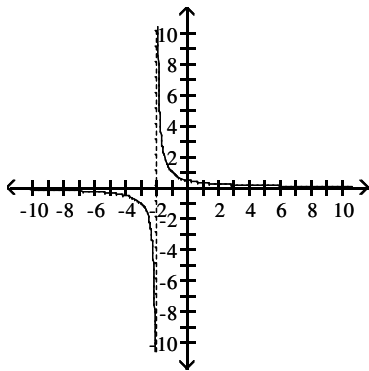
B) $f(x) = \frac{x+4}{x}$

C) $f(x) = \frac{x}{x+4}$

D) $f(x) = \frac{1}{x-4}$

51)

51) _____



A) $f(x) = \frac{x+2}{x}$

B) $f(x) = \frac{1}{x-2}$

C) $f(x) = \frac{1}{x+2}$

D) $f(x) = \frac{x}{x+2}$

Solve the rational equation.

52) $\frac{6}{x} + x = \frac{70}{x}$

52) _____

53) $\frac{9}{x} + x = \frac{13}{x}$

53) _____

$$54) \frac{x^2 + 2}{x} = \frac{6}{x}$$

54) _____

$$55) \frac{x^2 + 3}{x} = \frac{19}{x}$$

55) _____

$$56) \frac{x^2 - 9}{9x} = -\frac{5}{9x}$$

56) _____

$$57) \frac{x^2 - 14}{8x} = -\frac{5}{8x}$$

57) _____

$$58) \frac{x^2 - 14}{4x} = -\frac{5}{4x}$$

58) _____

$$59) \frac{1}{x - 4} = \frac{8}{x^2 - 16}$$

59) _____

$$60) \frac{1}{x - 1} = \frac{2}{x^2 - 1}$$

60) _____

$$61) \frac{1}{x - 9} = \frac{18}{x^2 - 81}$$

61) _____

Solve. Section 5.6A NUMBER PROBLEMS.

62) The sum of a number and 81 times its reciprocal is 18. Find the number. 62) _____

63) The sum of a number and 9 times its reciprocal is 6. Find the number. 63) _____

64) The sum of a number and 12 times its reciprocal is 8. Find the number(s). 64) _____

65) The sum of a number and 6 times its reciprocal is 7. Find the number(s). 65) _____

66) The sum of a number and 5 times its reciprocal is 6. Find the number(s). 66) _____

Solve. Section 5.6A. The time is equal for these and the distance is given. Wind speed is unknown.

67) A plane flies 490 miles with the wind and 350 miles against the wind in the same length of time. If the speed of the wind is 20 mph, what is the speed of the plane in still air? 67) _____

68) A plane flies 440 miles with the wind and 340 miles against the wind in the same length of time. If the speed of the wind is 30 mph, what is the speed of the plane in still air? 68) _____

69) A plane flies 500 miles with the wind and 340 miles against the wind in the same length of time. If the speed of the wind is 24 mph, what is the speed of the plane in still air? 69) _____

70) A plane flies 440 miles with the wind and 320 miles against the wind in the same length of time. If the speed of the wind is 27 mph, what is the speed of the plane in still air? 70) _____

Solve the problem.

71) Given $f(x) = \frac{x+9}{x-4}$ and $g(x) = \frac{x+9}{x-7}$, find $f(x) - g(x)$. 71) _____

72) Given $f(x) = \frac{x-7}{x-1}$ and $g(x) = \frac{x-7}{x+9}$, find $f(x) - g(x)$. 72) _____

73) Given $f(x) = \frac{x+3}{x+5}$ and $g(x) = \frac{x+3}{x-1}$, find $f(x) - g(x)$. 73) _____

74) Given $f(x) = \frac{x-2}{x+8}$ and $g(x) = \frac{x-2}{x-5}$, find $f(x) - g(x)$. 74) _____

75) Given $f(x) = \frac{8}{3x-21}$ and $g(x) = \frac{x}{x^2-49}$, find $f(x) + g(x)$. 75) _____

76) Given $f(x) = \frac{3}{4x-32}$ and $g(x) = \frac{x}{x^2-64}$, find $f(x) + g(x)$. 76) _____

77) Given $f(x) = \frac{10}{3x-6}$ and $g(x) = \frac{x}{x^2-4}$, find $f(x) + g(x)$. 77) _____

78) Given $f(x) = \frac{7}{4x-8}$ and $g(x) = \frac{x}{x^2-4}$, find $f(x) + g(x)$. 78) _____

Find the specified quotient function.

79) Given the functions $f(x) = x^2 - 3x - 10$ and $g(x) = x^2 - 5x - 14$, find an equation of the quotient function $\frac{f}{g}$. 79) _____

80) Given the functions $f(x) = x^2 + 2x - 24$ and $g(x) = x^2 - 2x - 48$, find an equation of the quotient function $\frac{f}{g}$. 80) _____

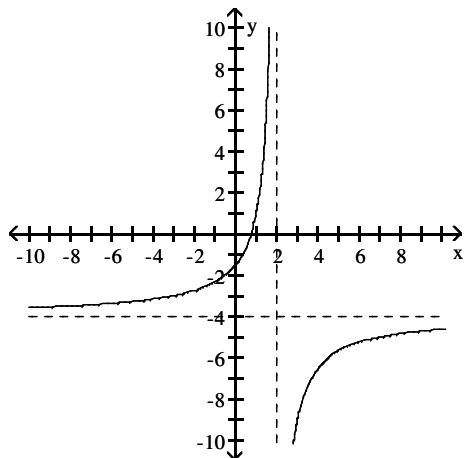
81) Given the functions $f(x) = x^2 - 5x - 24$ and $g(x) = x^2 - 6x - 27$, find an equation of the quotient function $\frac{f}{g}$. 81) _____

82) Given the functions $f(x) = x^2 - 16$ and $g(x) = x^2 - 13x + 36$, find an equation of the quotient function $\frac{f}{g}$. 82) _____

83) Given the functions $f(x) = x^2 - 16$ and $g(x) = x^2 + 3x - 28$, find an equation of the quotient function $\frac{f}{g}$. 83) _____

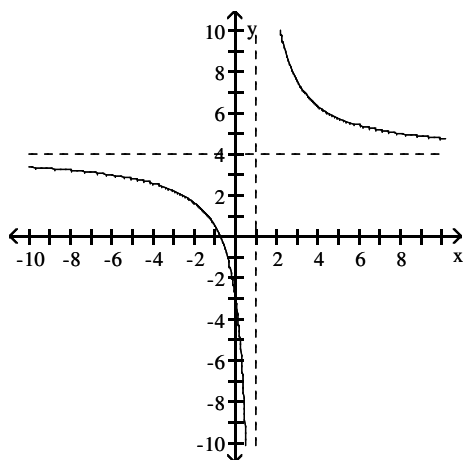
Identify any vertical or horizontal asymptotes in the graph of $y = f(x)$. State the domain of f .

84)



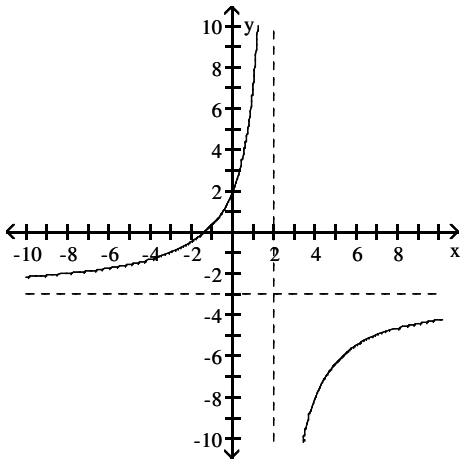
84) _____

85)



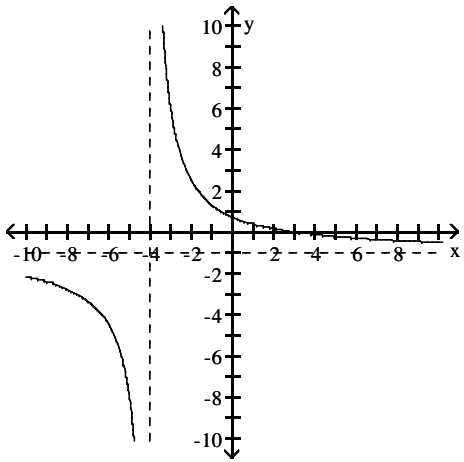
85) _____

86)



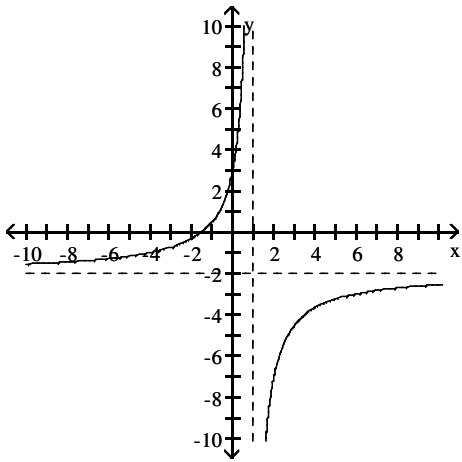
86) _____

87)



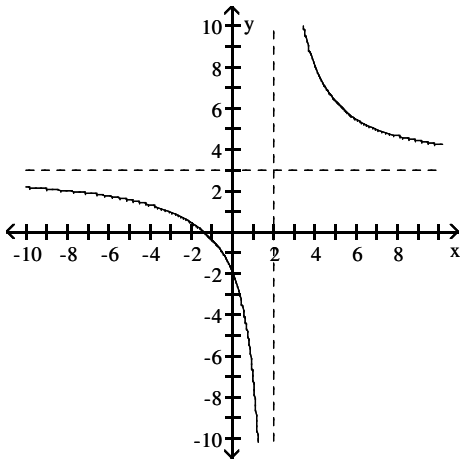
87) _____

88)



88) _____

89)



89) _____

Answer Key

Testname: EXAM2PREP_COMPRESSED_CH4ANDCH5V01

1) $4x^5 + 28x^2 + 15$

2) $3x^5 - 30x^2 - 16$

3) $-7x^5 + 7x^4 + 8x^3 + 11$

4) $-2x^4 - 5x^3 + 6x^2 - 5$

5) $-\frac{1}{10}x^2 - \frac{22}{5}x - 42$

6) $\frac{1}{9}x^2 + 7x + 110$

7) $x^3 - 27x + 10$

8) $9x^3 - 37x^2 + 13x - 1$

9) $(5x + 1)(x + 11)$

10) $(2x + 1)(x + 11)$

11) prime

12) $(3x + 2)(x - 3)$

13) $(2x + 3)(x + 4)$

14) prime

15) prime

16) $(2p - 1)(4p^2 + 2p + 1)$

17) $(4p - 1)(16p^2 + 4p + 1)$

18) $(7p - 1)(49p^2 + 7p + 1)$

19) $(x - 10)(x^2 + 10x + 100)$

20) $(x - 9)(x^2 + 9x + 81)$

21) $(x - 5)(x^2 + 5x + 25)$

22) $(t + 10)(t^2 - 10t + 100)$

23) $(t + 2)(t^2 - 2t + 4)$

24) $(t + 5)(t^2 - 5t + 25)$

25) $(ab + 4)(a^2b^2 - 4ab + 16)$

26) $(ab + 2)(a^2b^2 - 2ab + 4)$

27) \$11.25

28) \$13.33

29) \$456.52

30) \$490.65

31) 4.2 hr

32) 2.36 hr

33) $\frac{3}{x}$

34) $\frac{4}{x}$

35) $\frac{1}{5x + 2}$

36) $\frac{1}{5x + 4}$

37) $\frac{y + 7}{y + 8}$

Answer Key

Testname: EXAM2PREP_COMPRESSED_CH4ANDCH5V01

38) $\frac{y+2}{y+7}$

39) $\frac{m+5}{m-5}$

40) $\frac{m-8}{m+8}$

41) 3

42) 2

43) -8, -7

44) -5, -8

45) 7, 6

46) -8, 4

47) -2, 9

48) D

49) B

50) A

51) C

52) {-8, 8}

53) {-2, 2}

54) {-2, 2}

55) {-4, 4}

56) {-2, 2}

57) {-3, 3}

58) {-3, 3}

59) \emptyset

60) \emptyset

61) \emptyset

62) 9

63) 3

64) 2 or 6

65) 1 or 6

66) 1 or 5

67) 120 mph

68) 234 mph

69) 126 mph

70) 171 mph

71) $\frac{-3(x+9)}{(x-4)(x-7)}$

72) $\frac{10(x-7)}{(x-1)(x+9)}$

73) $\frac{-6(x+3)}{(x+5)(x-1)}$

74) $\frac{-13(x-2)}{(x+8)(x-5)}$

75) $\frac{11x+56}{3(x+7)(x-7)}$

76) $\frac{7x+24}{4(x+8)(x-8)}$

Answer Key

Testname: EXAM2PREP_COMPRESSED_CH4ANDCH5V01

$$77) \frac{13x + 20}{3(x + 2)(x - 2)}$$

$$78) \frac{11x + 14}{4(x + 2)(x - 2)}$$

$$79) \frac{f}{g}(x) = \frac{x - 5}{x - 7}$$

$$80) \frac{f}{g}(x) = \frac{x - 4}{x - 8}$$

$$81) \frac{f}{g}(x) = \frac{x - 8}{x - 9}$$

$$82) \frac{f}{g}(x) = \frac{x + 4}{x - 9}$$

$$83) \frac{f}{g}(x) = \frac{x + 4}{x + 7}$$

84) Vertical: $x = 2$; horizontal: $y = -4$; $(-\infty, 2) \cup (2, \infty)$

85) Vertical: $x = 1$; horizontal: $y = 4$; $(-\infty, 1) \cup (1, \infty)$

86) Vertical: $x = 2$; horizontal: $y = -3$; $(-\infty, 2) \cup (2, \infty)$

87) Vertical: $x = -4$; horizontal: $y = -1$; $(-\infty, -4) \cup (-4, \infty)$

88) Vertical: $x = 1$; horizontal: $y = -2$; $(-\infty, 1) \cup (1, \infty)$

89) Vertical: $x = 2$; horizontal: $y = 3$; $(-\infty, 2) \cup (2, \infty)$